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June 20, 2003

TO: Each Supervisor

FROM: Thomas L. Garthwaite, M.D. 
Director and Chief Medical Officer

Jonathan E Fielding, M.D., M.P.H. 
Director of Public Health and Health Officer

SUBJECT: **NATIONAL ASSOCIATION OF COUNTIES AWARD FOR VISUAL CMR**

This is to inform you that the Los Angeles County Department of Health Services is the recipient of a National Association of Counties (NACo) 2003 Achievement Award for its electronic communicable disease reporting system – Visual CMR. A description of the system is attached. An awards luncheon recognizing the winners will be held in Milwaukee, Wisconsin next month.

Under California law, medical providers, educators, and others are required to report approximately 85 diseases or conditions to their local health department; laboratories are required to report positive findings on 18 communicable diseases. Before implementation of Visual CMR the reporting system relied on telephone, fax, and manual data entry, requiring significant time to correct errors and redundancies prior to launching a public health response. As part of a CDC-funded initiative, the Department's Acute Communicable Disease Control (ACDC) unit and Morbidity Central Reporting Unit contracted Atlas Development Corporation to develop custom software that would streamline this reporting process.

Visual CMR uses new technology to centralize disease, outbreak, and foodborne illness reporting, enabling providers to report diseases electronically or via the Internet. In addition, health department staff can access all data in the system in "real-time," thereby avoiding delays. The system has improved the Department's efficiency by reducing the average length of time to complete case investigations by more than 50 percent and has facilitated stronger partnerships with numerous public and private providers.

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The Visual CMS system has improved Public Health's capacity to manage disease and outbreak investigations from notification to resolution. The system was also instrumental in improving disease tracking and management during the 2000 Democratic Convention held in Los Angeles and the terrorist events of September 11.

If you have questions or need additional information, please let either of us know.

TLG/JEF:jh

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Attachment

c: Chief Administrative Officer
County Counsel
Executive Officer, Board of Supervisors

LOS ANGELES COUNTY DEPARTMENT OF HEALTH SERVICES

PUBLIC HEALTH

Acute Communicable Disease Control & Data Collection and Analysis

NATIONAL ASSOCIATION OF COUNTIES
2003 ACHIEVEMENT AWARDS APPLICATION

Visual CMR: a state-of-the-art disease reporting and tracking system

1. ABSTRACT OF THE PROGRAM

Visual CMR is an electronic reporting system for communicable diseases. Its main purpose is to make disease reporting, investigation, and tracking more efficient for Disease Control Programs in Los Angeles County. It allows staff to manage the investigative cycle of a disease case or outbreak from notification to resolution.

Visual CMR utilizes new technology to centralize disease, outbreak, and foodborne illness reporting and has greatly improved internal communications among all components of the epidemiologic investigation team. The system is highly adaptable and can be used by other units within DHS to automate case management and tracking to provide wireless notification to public health officials in support of emergency response. It was instrumental in improving disease tracking and management during the Democratic Convention (LA-2000) and the September 11th events in 2001.

Visual CMR has the ability to alert key public health staff when a disease identified as having “potential bioterrorist agents” is reported. The system has greatly improved the department’s efficiency and has reduced the average length of time to complete case investigations by more than 50%. The success of Visual CMR has allowed LAC to establish strong partnerships with numerous public and private providers.

2. THE PROBLEM/NEED OF THE PROGRAM

Under California Code of Regulations, Title 17 (section 2500), medical providers, educators, and others are required to report approximately eighty-five diseases or conditions to their local health department; laboratories are similarly required to report positive findings on 18 communicable diseases. Los Angeles County (LAC) Department of Health Services (DHS) is responsible for communicable disease surveillance, outbreak investigation, and control for a region of 4,000 square miles with almost ten million inhabitants. Within DHS, the Acute Communicable Disease Control (ACDC) unit oversees surveillance and conducts outbreak investigations of all diseases except tuberculosis, HIV and sexually transmitted diseases.

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The old reporting system was replete with errors and redundancies. This old system also did not track the progress of staff as they investigated disease outbreaks, cases often lingered unresolved or staff waited until cases were closed before entering them. There was no “real-time” access of information for staff working on investigations and data export were restricted to just Two (2) system administrators and could sometime takes weeks to get requested data.

For decades, reports were received via mail and telephone and later by facsimile at 22 local offices. Clerks entered the data on a terminal that couldn't alert them that a patient had already been entered into the system; up to 50,000 case reports were processed annually. There are over 24,000 physicians, 400 laboratories, 120 hospitals, and 400 other health facilities in LAC with the potential to report. Reporting was incomplete and untimely, which contributed to delays in public health response. Since timelessness and accuracy of information is key to the investigation, control, and prevention of communicable diseases, it was imperative to streamline the reporting process by restructuring from a decentralized to a centralized reporting structure, and fully automating the workflow.

3. DESCRIPTION OF THE PROGRAM

In an effort to detect newly emerging infectious diseases, the Centers for Disease Control and Prevention (CDC) awarded Acute Communicable Disease Control (ACDC) start-up funds to upgrade its reportable disease data management system and to develop the capacity to accept electronic reports. The Enhanced Surveillance Project was created; its goals and objectives were to centralize and computerize the disease reporting system, speed up the reporting process, and improve internal communication between all Department of Health Services communicable disease (CD) investigative units.

California Code of Regulations, Title 17 (Section 2500), requires medical providers, educators, and others to report approximately eighty-five diseases or conditions to their local health department; laboratories are similarly required to report positive findings on 18 communicable diseases. Local public health agencies investigate these reports and take action to identify the source and control the spread of such diseases. In Los Angeles County, the Morbidity Unit is responsible for processing and tabulating most communicable disease reports; Acute Communicable Disease Control [ACDC] and district Public Health Services conduct investigation and control activities.

ACDC and Morbidity contracted with a private software company, Atlas Development Corporation to develop custom software using Visual Basic to accomplish the goals and objectives of the Enhanced Surveillance Project. ACDC and Morbidity staff developed the Statement of Work defining the services Atlas Development were to be provide in

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assisting the County in developing this new software. It also identified key features and functionality needed in migrating from the old reporting system, operating under the old Character User Interface (CUI), to a new more user-friendly reporting system using a Graphical User Interface (GUI).

The new system, known as Visual Confidential Morbidity Report, or *Visual CMR*, has been operational since May 2000. ACDC staff worked daily with contractor to ensure that the specifications and requirements were met. They also wrote the acceptance test plan and facilitated implementation of the new system.

Visual CMR operates on a shared server via the Department of Health Services Wide Area Network. Approximately 125 users located throughout the county are now on line at several security levels. Visual CMR has successfully centralized and computerized the disease reporting process, speed up receipt of incoming disease and outbreak reports, and improved internal communication between investigative units, including the Morbidity Unit, ACDC, district investigators, Environmental Health's Food and Milk Unit, and other public health programs.

The Windows-based graphical user interface environment has proven to be easily adaptable and very user friendly. Visual CMR combines reports of individual disease, outbreaks, and foodborne illness complaints into a single database. This has permitted Investigative staff to quickly identify clusters of disease and conduct deeper probes into underlying causes. This type of analysis was difficult to do with the former software because the system was closed and few staff knew the programming language. This same technology has facilitated development of electronic laboratory and web-based reporting with both public and private partners and will permit acquisition of other electronic medical data for such purposes as bioterrorism surveillance.

In April 2002, Kaiser Permanente Southern California Regional Reference Laboratory became the first healthcare agency in the County to transmit lab results into *Visual CMR* electronically, eliminating manual data entry. Kaiser Laboratory no longer has to fax hundreds of reports weekly to comply with state law. Electronically submitted reports are transmitted in less than 1 day from test completion, making follow-up more timely. On-call staff can be notified of critical events at any time reports are received. Other labs have been contacted and will soon begin sending standard results files via HL7 transmission standards to this system.

In June 2002, Web-based reporting was piloted with Infection Control Practitioners from the following hospitals: Cedars-Sinai Medical Center, Children's Hospital;

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Huntington Hospital; Antelope Valley Hospital; Kaiser Permanente-Harbor City; and Los Angeles County University of Southern California Medical Center. The project was designed to test the effectiveness of gathering disease information from a select group of practitioners who regularly report by faxing or mail. The pilot project has been very successful and plans are underway to offer web-based reporting to other public and private partners throughout Los Angeles County. Electronic laboratory and Internet-based reporting both include high-level security for confidentiality of personal medical information.

4. USE OF TECHNOLOGY

Visual CMR utilizes emerging technologies to forward information to pagers, cell phones and other wireless devices; a feature called ARNOLD™ (Advanced Results Notification and On Line Delivery) alerts designated staff when information about diseases of interest to them is added or changed. ARNOLD also notifies staff when key information is missing from disease reports and prints letters to physicians requesting the missing information. Visual CMR also uses the following technology:

Electronic Laboratory Reporting: Communication to the Visual CMR database is done directly over a CRYPTOCOM DES3 encryption modem. All data is transferred via 168-bit encryption.

- **LAN:** Local Area Network; Visual CMR runs on LAC private network and is authenticated via NT security.

Internet browser based data entry and data management: Access to Web-based CMR is through 128 bit browser and user id and password. Digital certifications are install on workstations of each user for additional security.

Software: Microsoft Visual Basic and Intersystem Cache

- **WAN:** wide-area-network connectivity enabling staff in multiple locations throughout the county to access all data in the system.

Websites: Visual CMR On-line Demo and Web CMR: A web site has been developed that features a dynamic guided tour outlining key features and functions of our reporting system. The guided tour and on-line interactive demo can be accessed at: <http://www.myphd.net>

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5. THE COST OF THE PROGRAM

The initial cost for development, maintenance and support of this system for Year 01 was \$120,000; \$99,000 for development and \$21,000 for maintenance and support. Additional funds were made available in Year 02 and 03 for enhancements and future development. To date, Visual CMR contains Seven (7) Interfaces: Disease Incident; District Review; Domain; Foodborne Illness; Laboratory Interface; Multiple Document; and Web CMR. Visual CMR also features an “On-line Help” function which serves as an instruction and reference manual.

Los Angeles County Department of Health Services owns Visual CMR. The California Department of Health Services has expressed an interest in using Visual CMR to replace their reporting system. As a result, in April 2002, Los Angeles County Board of Supervisors approved a Marketing Agreement with Atlas Development giving Atlas exclusive rights to market the software. Under this agreement the County receives a royalty fee of ten (10%) for each sub-license obtained by Atlas.

Visual CMR was designed to interface with a number of software programs. The software will be enhanced to meet the needs of entities wishing to sub-license Visual CMR. Therefore, cost for enhancements will be based on the needs of each user. However, the cost for enhancing the software will be considerable less than the cost for initial development.

6. THE RESULTS/SUCCESS OF THE PROGRAM

Upgraded reportable disease data management system:

Visual CMR has facilitated establishment of a central repository and database of all incoming reports, (whether by fax, telephone, Internet, or electronic lab reporting) for all disease, foodborne illness, and outbreak reports. It has also reduced duplication of effort and has facilitated more efficient data gathering and data sharing methods with other units in Public Health including: ACDC; District Public Health Registrars; Environmental Health’s Food and Milk Division; Immunization Program; Morbidity CD Surveillance Unit; Public Health Nursing; and Public Health Investigators.

Visual CMR has automated routine data functions such as duplicate record checking, soundex name matching, and census tract/health district determination. It has enabled staff in multiple locations to have “Real-time” access to all data in the system and giving

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them the ability to quickly generate epidemiological reports to identify clusters of diseases and monitor status of disease investigation. Efficiency has improved, such that the average length of time to complete case investigations is at least 50% faster.

Developed the capacity to accept electronic reports:

Electronic reporting has given providers the option of reporting via electronic laboratory or Internet. Electronic reporting has also promoted intergovernmental cooperation and coordination in addressing shared problems. For example, Kaiser Permanente no longer has to fax hundreds of lab reports weekly to the County to comply with state law. These reports are received with-in 1-day of test completion, making follow-up more timely for public health investigators.

Visual CMR has generated interest from the State Department of Health Services, other county health departments in California and medical entities around the nation. It was the recipient of the Los Angeles County Board of Supervisors 16th Annual Productivity and Quality Award, the “Arthur Gutenberg Technology Award”, in October 2002. It received recognition at both the Southern and Northern California 3rd Annual State Morbidity Conference and has been recognized statewide and nationally for innovation including the University of Michigan 2002 Symposium on Laboratory Information Systems, the May 2002 College of American Pathologists newsletter, and other Information Technology trade magazines and journals.

WORTHINESS OF AN AWARD

Upgrade the working conditions or level of training for county employees:

Computer skills and special training was provided for approximately 110 users of the new reporting system. Under the old system, reports were faxed to approximately 12 different sites where clerks entered the data on a terminal that couldn't alert them that a patient had already been entered into the system. Visual CMR is on a wide-area-network so staff now has access to all data in the system. The training involved learning word processing skills, instructions on Internet and e-mail, as well as learning new skills necessary to enter information into Visual CMR. Training continues to be provided on an on-going and as needed basis.

Fill gaps in the availability of existing services and promote intergovernmental cooperation and coordination in addressing shared problems:

Visual CMR has filled gaps in the availability of existing services by providing an electronic communicable disease reporting system that accepts disease reports from providers Three (3) ways: Electronic Laboratory Reporting; Internet-based Reporting; and Manual Entry. This has promoted cooperation and coordination in addressing shared

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problems with both public and private partners. For example, “Kaiser’s collaboration with local and state public health departments was especially helpful in dealing with the threat of anthrax and other potential bioterrorist agents in California. Acceptance of electronic laboratory reports has also facilitated acquisition of other electronic data for bioterrorism surveillance.